A Review of Research Findings on Neuro-Linguistic Programming

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A Google search for the "NLP" acronym yields nearly 16 million hits. On entering the phrase "neuro-linguistic programming," 695,000 hits are returned. These figures reflect the widespread worldwide interest in NLP. The method enjoys recognition from a wide variety of professionals, including psychotherapists and human resource specialists, who see it as both a personal enhancement method and a therapeutic procedure. What is more, NLP practitioners are also found among university faculty. Advertisements promoting a vast array of NLP-related institutions appear in popular science magazines. Students of psychology attend training courses to obtain successive degrees of initiation for NLP practitioners. NLP training is provided not only to well known commercial companies such as Hewlett-Packard, IBM and McDonald's, but also to public institutions such as NASA, the U.S. Army, U.S. Olympic teams, and in countless public schools (Singer & Lalich, 1996; Tosey & Mathinson, 2010). It has been suggested that NLP is "being applied widely, if often informally in UK education" (Tosey & Mathison, 2003, p. 371). An investigation of the psychology curricula of 12 leading public universities in Poland revealed that eight offered coursework focused in part or exclusively on NLP (Witkowski, 2009).

Despite the widespread popularity of NLP, it is virtually absent from academic textbooks. No leading textbooks of psychopathology or psychotherapy present an in-depth discussion of the NLP model. NLP's popularity in the business and academic world begs the question of its actual scientific status.

Outline of the NLP Model

In the 1970s, Richard W. Bandler and John Grinder had the idea to create a practical therapy model. They reasoned that a group of recognized psychotherapists acted on the basis of implicit theories that helped them achieve substantial psychotherapeutic effectiveness and great rapport with clients. Grinder and Bandler concluded that careful observation of these skillful therapists at work should lead to the identification of

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successful patterns of practice, which would then be empirically verified and disseminated to other practitioners. For several years, they observed such therapists as Fritz Perls, Milton H. Erickson, and Virginia Satir at work. Based on these observations and reflections, Grinder and Bandler formulated NLP's tenets and hypotheses. With time, their strategy was promoted as a "science of excellence." It reflected a procedure also known as "modeling," in which one studies the performance of highly successful people from different walks of life in order to learn skills to improve one's own personal and professional life (O'Connor & Seymour, 1993).

The originators of NLP described it as a "model" rather than a "theory." The central philosophy of the NLP model is summed up in the phrase "the map is not the territory" (e.g. Lankton, 1980, p. 7). The idea is that each individual operates on the basis of his or her internal representation of the world (the "map") and not the world itself (the "territory"). One's interactions with the world are formed by mental maps created from one's surroundings. The maps are by nature distorted, limited, and inflexible. The task of the therapist is to understand the client's particular map and to convey that understanding to the client. As Heap (2008) and Newbrook (2008) maintained, this philosophy was verbalized by the philosopher and linguist Alfred Korzybski (1933).

At the core of NLP lies the notion of a preferred representational system (PRS). It is argued that the maps people make of their world are represented by five senses: visual; kinesthetic (referring to both tactical and visceral sensations); auditory; olfactory; and gustatory. Every experience is composed of information received through these sensory systems. NLP proponents coined the term "representational systems" to describe the patterns in the way that sensory data are represented in people's minds (Grinder & Bandler, 1976; Bandler & Grinder, 1979). They claimed that every person processes most information using predominantly one PRS.

Another ostensible discovery of which NLP originators were particularly proud was the idea that access to the representational systems is possible through so-called "accessing cues," and more specifically, through eye movements (EMs). They explained, for instance, that a person engaged in a cognitive activity in the visual mode would tend to look upwards, whereas a person using the auditory model would tend to look horizontally (Bandler & Grinder, 1979). The kinesthetic mode is believed to be associated with a gaze downwards to the right. Thus, a careful observation of such eye movements should enable an NLP therapist to unequivocally identify the PRS of a client or an interlocutor and, as a consequence, facilitate a therapeutic intervention matched to the individual's particular PRS.

The final assertion is that by matching, mirroring, or pacing clients' verbal and non-verbal behavior, including their PRS, the NLP practitioner has the opportunity to achieve effective communication, gain the client's trust, and enhance rapport. Reflecting on the example of model therapists, in order to work effectively with a client, the therapist should strive to match the client's PRS to be able to use his or her "map." A trained practitioner can identify the method in which information is stored through careful observation of the client's eye-gaze patterns, posture, breathing patterns, tone of voice, and language patterns. Subsequently, the therapist takes every care to match the client's PRS while communicating with him or her. PRS matching effected through following the same language patterns—i.e. by using predicates typical of the mode operated by the client-ostensibly yields the best results in facilitating communication and enhancing therapeutic effectiveness.

The NLP originators promoted it as a sensationally effective and rapid form of psychological therapy. They claimed that NLP helped overcome such problems as phobias and learning disabilities in less than an hour's session, whereas with other therapies, progress might take weeks or months (e.g. Bandler & Grinder, 1979, p. ii; Lankton, 1980, pp. 9–13). They also maintained that a single session of NLP combined with hypnosis could eliminate certain eyesight problems, such as myopia (Grinder & Bandler, 1981, p. 166), and even cure a common cold (Grinder & Bandler, 1981, p. 174). Today, we can find similarly alluring promises in many NLP programs and advertisements.

The development of NLP can be analyzed in terms of a particular research paradigm within social psychology known as the "full cycle" approach, developed by Robert Cialdini (1980). Cialdini critically argued that experimental lab-based research, although offering the opportunity to control variables and establish causality, had several accompanying weaknesses. The most prominent was the inability to determine the strength or prevalence of phenomena in the natural environment. Cialdini argued instead that researchers should use naturalistic observation to determine the presence of an effect in the real world, then develop a theory to determine what processes may underlie the effect, followed by experimentation to verify the effect and its underlying processes, and finally return to the natural environment to corroborate the experimental findings.

Bandler and Grinder omitted the critical stage of empirical verification of their assertions. They found

that part of the process redundant and unnecessary, and so moved directly to the formulation of the model and to putting it into practice. They were known for their openly demonstrated contempt for the scientific verification of NLP hypotheses:

> As far as I can tell, there is no research to substantiate the idea that there is eyedness. You won't find any research that is going to hold up. Even if there were, I still don't know how it would be relevant to the process of interpersonal communication, so to me it's not a very interesting question (Bandler & Grinder 1979, p.31).

Nevertheless, many subsequent researchers did subject NLP to empirical evaluation.

Review of Research to Date

Beginning in the 1980s, a wide range of articles on NLP were published. Particular attention should be paid to several reviews of research on the effectiveness of NLP. The first two were conducted by Sharpley (1984; 1987). In his first analysis, he reviewed 15 studies examining the possibility of identifying and matching clients' PRS. Sharpley (1984) concluded that ". . . the identification of this PRS (if it is a PRS and not merely current language style) by either eye movements or self-report is not supported by the research data. . . . The existence or stability of the PRS is irrelevant to predicate matching as a counseling process, and parsimony argues for the process rather than the yet unverified theory. . . . Of most importance, there are no data reported to date to show that NLP can help clients change" (p. 247).

The second review (Sharpley, 1987) is even more conclusive. It was written as a response to a critical paper by Einspruch and Forman (1985), who analyzed 39 studies on NLP and described methodological errors and a lack of sufficient knowledge about the theoretical underpinnings of NLP demonstrated by authors. Sharpley took into account works investigated by Einspruch and Forman and expanded that sample with additional ones to perform an analysis of 44 studies. Six papers (13.6%) provided evidence supportive of NLP-derived theses, 27 (61.4%) failed to lend support for one or more of those tenets, and 11 (25%) showed only partial support. Sharpley examined all works available, starting from doctoral dissertations to papers published in high-ranking peer-reviewed journals. He summed up his review as follows:

> "There are conclusive data from research on NLP, and the conclusion is that the principles and procedures suggested by NLP have failed to be supported by those data. . . . Certainly research data do not support the rather extreme claims that proponents of NLP have made as to the validity of its principles or the novelty of its procedures" (pp. 105–106).

There are also other important research reviews. In 1988, Heap analyzed 63 studies and concluded that the assertions of NLP writers concerning representational systems had been objectively investigated and found to be wanting. The hypothesis that it is possible to identify PRS through careful observation of eye movements was likewise not confirmed. In Heap's view, the stated conclusions and the failure of investigators to demonstrate convincingly the alleged benefits of predicate matching seriously questioned the role of such procedures in counseling. Dorn, Brunson, Bradford and Atwater (1983) similarly concluded from their review that there was no demonstrably reliable method of assessing the hypothesized PRS.

If the NLP assertion of a reliably identifiable PRS, and the corresponding ability to enhance communication through PRS matching proved to be true, it would have important implications for neuroscience, cognitive psychology, and a number of other disciplines. If the NLP claims concerning its instant effectiveness proved to be true, the field of psychotherapy would be transformed, perhaps even revolutionized, and research reporting the effectiveness of therapy would position NLP as a potential first-rate therapy. Nothing like this is taking place. Instead, experts warn against using NLP and classify it is as one of many dubious "fringe therapies" (Beyerstein, 2001) or "power therapies" (Devilly, 2005). NLP is also found on many lists of discredited therapies. Norcross, Koocher and Garofalo (2006) sought to establish consensus on discredited psychological treatments and assessments using the Delphi methodology. A panel of 101 experts participated in a 2-stage survey, wherein they had to report familiarity with 59 treatments and 30 assessment techniques and rate them on a continuum from *not at all discredited (1)* to *certainly discredited (5)*. Neuro-linguistic Programming for treatment of mental/behavioral disorders was assessed at an average of 3.87 (SD=0.92). For comparison, "angel therapy for treatment of mental/behavioral disorders" obtained the highest score, M=4.98 (SD=0.14), and "behavior therapy for sex offenders" obtained the lowest, M=2.05 (SD=0.91).

Similarly, Roderique-Davies (2009) cautioned against applying NLP to therapeutic practice in an article *Neuro-linguistic programming: Cargo cult psychology?*, in which he concluded:

> "NLP masquerades as a legitimate form of psychotherapy, makes unsubstantiated claims about how humans think and behave, purports to encourage research in a vain attempt to gain credibility, yet fails to provide evidence that it actually works" (p. 62).

The Army Research Institute (ARI) asked the National Research Council to assess the credibility of "New Age" techniques, including NLP, considered for implementation by the U.S. Army with a view to enhancing human performance. The committee in charge of the review also challenged the effectiveness of NLP. They concluded:

> "The conclusion was that little if any evidence exists either to support NLP's assumptions or to indicate that it is effective as a strategy for social influence" (Swets & Bjork, 1990, p. 90).

Von Bergen, Soper, Rosenthal and Wilkinson (1997) analyzed areas of application of "alternative training techniques" in human resources management, and likewise concluded:

> "We identified four alternative training techniques that have been widely touted and sold to government and industry: subliminal stimulation, mental practice, meditation, and NLP. Finding that the claims made for three of these techniques, mental practice being the exception, did not stand up to scientific scrutiny, we encourage HRD professionals to guard against substituting testimonials and popularity in the marketplace for research evidence when they consider a new training aid" (p. 291).

An evaluation of the effectiveness of NLP as a communication theory and its contribution to clinical practice and family therapy is similarly unflattering:

> "The academic verdict on NLP is given: NLP's theory of the person cannot account for the wide range of intrapsychic and interpersonal problems encountered in clinical practice. A final verdict is withheld until further clinical studies and experimental investigations are reported" (Baddeley, 1989, p. 73).

More than 20 years have passed since the last systematic and comprehensive research reviews were published, yet NLP still wins widespread support and recognition outside of the academy. The very titles of prior reviews repeatedly used such provisional expressions as "an interim verdict" (Heap, 1989), or "the academic verdict so far" (Baddeley, 1989), suggesting that more definitive conclusions should await further research. This raises the question of whether the scientific status of NLP has changed since it was last examined. Are there any new research findings in this area? Are the outcomes of newer studies sufficiently supportive to verify some of the claims regarding NLP, or can we reach more definitive conclusions about the lack of scientific evidence for the model?

METHOD

Literature search and selection

In order to conduct a systematic review of the current scientific status of NLP, all known published papers describing empirical studies of NLP were identified and analyzed. The present review sought to conduct a synthesis of empirical studies published after the reviews compiled by Sharpley (1984, 1987) and Heap (1989).

One of the most extensive registers of such studies is found on the web pages of the NLP Community itself (http://www.nlp.de/cgi-bin/research/nlp-rdb.cgi). Called the "Neuro-Linguistic Programming Research Data Base (State of the Art)," as of November 2010 it contains abstracts and bibliographic information for 320 articles, the majority of which represent empirical studies, written by 290 authors and published in the years 1974-2010. The database was created at the University of Bielefeld in Germany in 1992, and subsequently moved to Berlin. It was designed to pool and organize available studies on NLP from all over the world. The registry is seen by its creators as "state of the art," being updated and recommended on an ongoing basis by numerous institutions worldwide that promote NLP. Of the various on-line data bases developed by NLP proponents, this one offers the largest number of entries.

In order to ensure the completeness of the present review, I conducted a search of the PsycINFO database to determine if there were any additional studies not included in the aforementioned NLP database. In effect, 240 publications were recorded in both databases, and 80 articles available in the NLP database were not found in PsycINFO. Furthermore, PsycINFO included 81 publications that were not available in the NLP database. As a consequence, the present review included all publications from both databases, i.e., 401 articles in total.

There are three major arguments to support the procedure used to identify works for analysis. First, using all articles taken from the database that was established by proponents of NLP refutes concerns regarding selection bias against the approach. Second, verifying these papers against the PsycINFO data base and the resultant inclusion of the additional publications guarantees that the sample to be analyzed was not, conversely, biased in

favor of NLP claims. Third, by including works not found in the PsycINFO data base, I incorporated the so-called "gray" or "fugitive" literature in the review, which allowed for a more comprehensive analysis of the phenomenon (Petticrew & Roberts, 2006).

General analysis

The history of scientific interest in NLP from its formulation up to the present was examined with two sets of data. First, the entire population of 401 studies was evaluated. Second, in order to examine the most methodologically sound studies, a subset of papers that were published in prestigious journals was identified. The latter group of studies was identified as having been published in journals listed on the Master Journal List of the Institute for Scientific Information in Philadelphia. Journals included on this list tend to have the highest standards for publication, thereby enhancing the credibility of the findings. Of the initial 401 articles, only 66 (16.5%) were published in journals on the Master Journal List. The sample of 66 studies comprised articles published in 30 different journals (see Table 1). The number, variety, and scope of these journals support the credibility of the empirical evidence gathered. That is, it is unlikely that one journal (or a small number of journals) consistently published papers that were biased either in favor of or against NLP.

In terms of the number of publications over time, as seen in Figure 1, scientific research peaked in the 1980s, and experienced a minor renaissance at the beginning of the present century. In addition, publications in prestigious journals roughly paralleled the larger total sample.

Table 1

Number of articles published in individual journals

Journal	Number of articles
Journal of Counseling Psychology	14
Perceptual and Motor Skills	10
Psychological Reports	6
Professional Psychology: Research and Practice	4
Psychological Bulletin	3
American Journal of Clinical Hypnosis	2
International Journal of Clinical and Experimental Hypnosis	2
Psychological Science	2
Management Decision	2
American Journal of Family Therapy	1
Anaesthesia	1
Assessment & Evaluation in Higher Education	1
Brain and Cognition	1
British Journal of Clinical Psychology	1
European Psychologist	1
Gerontologist	1
International Journal of Hospitality Management	1
International Journal of Language & Communication Disorders	1
Journal of Abnormal Psychology	1
Journal of College Student Development	1
Journal of Consciousness Studies	1
Journal of Consulting and Clinical Psychology	1
Journal of Marital & Family Therapy	1
Journal of Multicultural Counseling and Development	1
Journal of Nonverbal Behavior	1
Journal of Social Psychology	1
Neuropsychologia	1
Psychosomatics	1
SA Pharmaceutical Journal	1
Total Quality Management & Business Excellence	1

Detailed analysis of empirical studies

As discussed above, prior reviews of NLP research (Heap, 1989; Sharpley, 1984, 1987) yielded a comprehensive view of the empirical status of the NLP model until the mid 1980s. I therefore selected studies published after 1986 for more detailed review. In addition, studies were selected that explicitly described controlled, empirical works that tested the basic tenets of NLP or the effectiveness of NLP techniques within the fields of education, communication, psychotherapy, or management. This resulted in a sample of 31 studies, most of which were randomized controlled trials (RCTs),

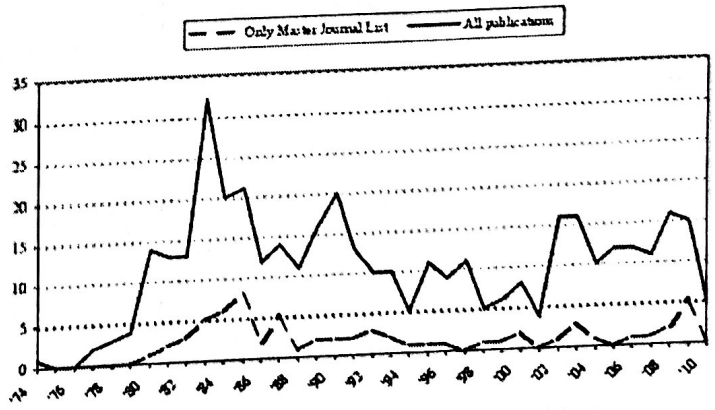


Figure 1. Number of all publications in individual years as against the number of studies of Master Journal List.

Table 2

Comparison of 11 studies investigating basic NLP tenets

Study	Focus of study	Study population	Study design	Dependent variable	Outcome Supportive	Outcome Nonsupportive	Outcome Uncertain	Comments
Schleh (1987)	EMs in children as an indicator of RS mode	Children, 3 age groups—1st, 5th grade, and high school	NROS	EMs agreement with mode of question		EMs were unrelated to modality of question		Results suggest a developmentally based bias in the direction of EM responses
Monguio-Vencino & Lippman (1987)	Image formation as related to a visual fixation point	16 right-handed undergraduates replication 33 Ss	NROS	The intensity of evoked visual images latency of image formation		Eye fixation was unrelated to the formation of imagery		
Buckner & Mera (1987)	EM as an indicator of sensory components in thought	48 graduates and undergraduates	NROS	EMs agreement with mode of thoughts	Visual and auditory thoughts were in agreement with SSs EMs	Kinesthetic mode of thoughts was not observed		
Bliemeister (1987)	EMs as an indicator of RS mode	40 right-handed and 9 left-handed	NROS	EMs agreement with mode of question		EMs were unrelated to modality of question		
Bliemeister (1988)	EMs as an indicator of RS mode	40 right-handed and 40 left-handed	NROS	EMs agreement with mode of question		EMs were unrelated to modality of question		
Jupp (1989a)	EMs as an indicator of RS mode	190 psychology and counseling students	NROS	EMs agreement with mode of question		EMs following questions were not associated with mode of question		
Jupp (1989b)	Effectiveness of matching PRS in hypnotic inductions	60 undergraduates	NROS	Behavior responsiveness and hypnotic depth		Tailored inductions did not affect hypnotic depth		
Baddeley & Predebon (1991)	EMs as an indicator of RS mode	62 female undergraduates	NROS	EMs agreement with mode of question		EMs were unrelated to modality of question	Post-hoc tests located some distinctive eye-movement trends	
Lichtenberg & Moffitt (1994)	The effect of predicate matching on perceived understanding and factual recall	99 male undergraduates (aged 18–29 yrs)	NROS	Objective and subjective understanding	Results only weakly supported enhanced accuracy of understanding when speaker and listener PRSs were matched			
Turan & Stemberger (2000)	The effect of matching language on perceived empathy	20 participants aged 15–40 yrs old	RCT	Perceived empathy	Participants whose language was matched rated the interviewer as significantly more empathic than participants who were mismatched.			
Burke et al. (2003)	Relation between eye-movements and thought processing	8 graduate and premedical students	NROS			Instead of a universal pattern, this study yielded subject-specific idiosyncratic EMs across all modal		

Note. EM = eye movement; RTC = randomized controlled study; NROS = non randomized observational study; PRS = primary representational system.

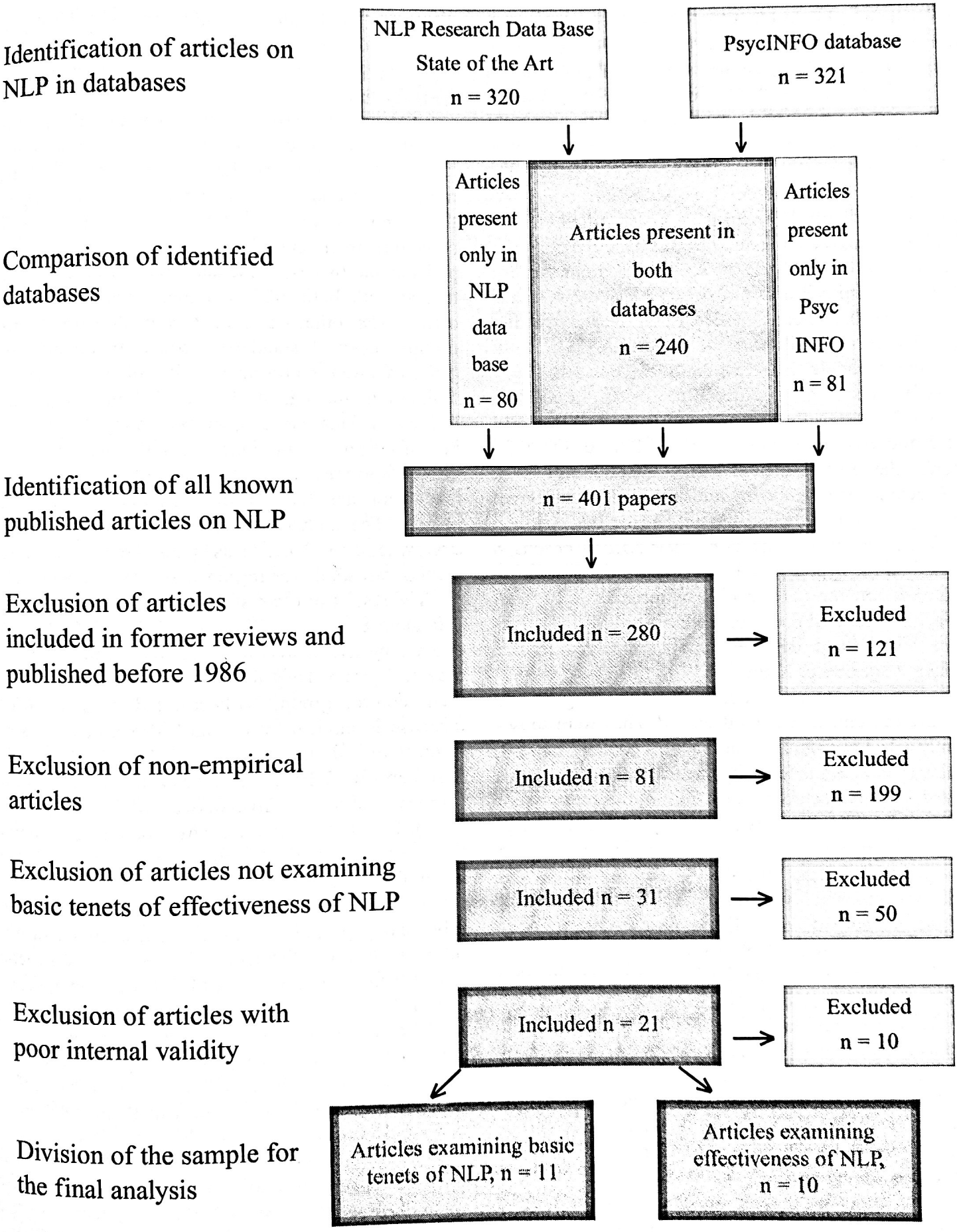


Figure 2. Inclusion/exclusion criteria and the decision process of choosing articles for the final analysis.

non-randomized controlled trials (NRCTs), or non-randomized observational studies (NROSs). Further review revealed that the methodology of some of these papers was problematic, reflecting various threats to their internal validity. Inclusion of these works in the review would have distorted the conclusions. The problematic studies included the works of Witt (2003, 2008), in which the independent variable was a complex therapeutic intervention called the "Hildesheim health training," and which included a combination of behavior therapy, classical conditioning, hypnosis and NLP. Similarly, the works by Einspruch and Forman (1988) and Sumin and colleagues (2000) were excluded. Other excluded studies either lacked a control group (e.g., Scott, 1987), or utilized inappropriate statistical analyses (Bowers, 1996). These methodological criteria narrowed the sample down to 21 studies for further analysis. Among these, 11 tested the basic assumptions of NLP (see Table 2), whereas the remaining 10 examined the effectiveness of NLP techniques within communication, education, business organizations or clinical practice (see Table 3).

Among the works that tested basic NLP assertions, 8 focused on the hypothesized link between the processing of information through a specific representational system and eye movements. Seven of these did not show any evidence for NLP, and only one supported the hypothesis in question (Buckner & Mera, 1987). In this study, participants were asked to concentrate on a single thought while their eye movements were videotaped. They were subsequently asked to report if their thoughts contained visual, auditory, or kinesthetic components. Trained observers viewed silent videotapes and recorded the presence or absence of eye movements posited by NLP theorists to indicate visual, auditory, or kinesthetic components in the participants' thoughts. This study found that visual and auditory components were in agreement with subjects' eye movements. In contrast, the predicted kinesthetic mode of thoughts was not observed.

Three other studies examined the NLP assertion that matching, mirroring, or pacing the client's verbal and non-verbal behavior, including their PRS, makes it possible to achieve effective communication, gain trust, or establish a close rapport with clients. Turan and Stemberger (2000) concluded that participants whose language had been matched rated the interviewer as significantly more empathic than those participants who had been mismatched. This conclusion was broadly supportive of NLP. Results of another study (Lichtenberg & Mofifitt, 1994) only weakly supported the enhanced accuracy of understanding when the speaker's and the listener's PRSs had been matched. In a third study (Jupp, 1989b) tailored inductions did not affect the depth of hypnosis. In sum, out of the sample of 11 works evaluating basic NLP tenets, 73% were non supportive, 18% partially supportive, and 9% supportive.

The remaining studies focused on such diverse fields that it would be difficult to pool them into specific classes. They all tested the effectiveness of NLP techniques. Only one supported and three partially supported the effectiveness of NLP. Lund (1995) evaluated a psychological treatment of asthma symptoms. He assigned patients into two experimental groups. The first one was treated with both NLP and traditional medical treatments. The other—control treatment-as-usual (TAU) group—received standard medical treatments. Both groups showed improvement, with some significant differences in the NLP-treated group. In this group an increase in lung capacity, as well as a reduction in the rate of hospital admissions and in the number of acute asthma episodes, were observed. The consumption of medication and the rate of sleep disorders were also reduced. The study's design, however, precluded conclusions whether NLP per se, as opposed to additional treatment of any kind, was responsible for those benefits.

The results of other studies were less impressive. In a randomized study, Stipancic et al. (2010) 106 psychotherapy clients were assigned to a therapy group and a control group. They found that, relative to a no treatment control group, NLP resulted in a significant decrease in clinical symptoms (as measured by structured Clinical Interview for DSM-IV Personality Disorders–SCID II) and an increase in the quality of life (as measured by the Croatian Scale of Quality of Life – KVZ). The absence of any control conditions beyond no treatment greatly limits any conclusions that can be drawn from this study.

MacMorran (1987) tested the effects of the NLP submodality procedure on disturbing memory. In NLP, submodalities are distinctions in the form or structure (rather than content) within a PRS. For example, regardless of the content, both external and mental images of any kind are either colored or monochrome, and stationary or moving. NLP asserts that among the many possible submodalities, there will often be a handful of so-called "critical" submodalities that can functionally effect a large-scale change. The submodalities differ among people, and can be identified by observation and inquiry. NLP claims a quick and permanent relief from the unpleasant affect associated memory that follows a submodality treatment. MacMorran found partial support for the predictions, in that the NLP submodality participants reported a change with respect to unpleasant

affect associated with a disturbing memory and were more satisfied with treatment as compared with participants in an attention-placebo control group. The remaining seven studies did not show support for any of the NLP tenets.

In conclusion, among studies focusing on the effectiveness of NLP techniques, 70% of the studies were non-supportive, 20% were partially supportive, and 10% were supportive, with the last group to some extent limited by methodological shortcomings.

Discussion

The present review is consistent with earlier reviews in finding that the vast majority of research studies have not supported either the fundamental tenets or the techniques of NLP. Among the 401 published papers on NLP, none were systematic research reviews supportive of the model. The only paper that might be regarded as such (Einspruch & Forman 1985) represents in fact a criticism of the available empirical evidence base. Among the large number of published papers on NLP, only a few represent empirical studies, and even fewer still report on studies that meet basic methodological criteria that permit conclusions to be drawn. Among the studies classified as NLP supportive, none would unambiguously demonstrate the existence of various representational systems. Similarly, there is no support for the hypothesis that participants used one predominant representational system across different life situations. Apart from one study (Turan & Stemberger, 2000), there is almost no evidence that matching the individual's primary representational system improves communication and therapy. The overwhelming majority of studies do not provide support for the basic tenets of NLP. Similarly, there is a lack of evidence to support the effectiveness of NLP techniques.

These conclusions are underscored even further when considering possible publication biases resulting from the file drawer effect (Rosenthal, 1979). According to this phenomenon, NLP supportive studies should be more likely to have been published than those showing lack of support. It is likely that studies that did not find any support for the NLP hypotheses were less likely to be published, being quietly filed away by researchers.

The parallels between the findings from the present review and the earlier reviews conducted over 20 years ago by Heap (1988) and Sharpley (1984, 1987) are striking. Indeed, the very proportions of individual categories of studies are similar. For instance, Sharpley (1987) identified 13.6% NLP-supportive works, 25% partially supportive, and 61.4% non-supportive.

Despite this lack of scientific support, NLP has evolved into a big business, luring people with prospects of amazing changes, opportunities for great personal development, and uniquely effective psychotherapy results. This raises an important ethical question: Is it ethical to promote an intervention that is devoid of scientific support? Many proponents of NLP will undoubtedly respond as Einspruch and Forman (1985) did, claiming that the effectiveness of NLP undertaken in authentic clinical contexts by trained practitioners has not yet been properly investigated. Moreover, some will certainly reassert that "clinical experience" confirms that NLP "works," and that this is sufficient reason to use it. Nevertheless, the burden of proof to provide evidence of the effectiveness of any approach lies squarely with its proponents, not skeptics. As O'Donohue and Ferguson (2006) proposed, therapies having no empirical supportive evidence should be explicitly termed "experimental." They also advised that practicing such therapies without fully informing the client about its experimental status should be treated as criminal activity. Just as it would be unacceptable for pharmaceutical companies to offer to the public a medicine whose side effects were uncertain or unknown, we should not turn a blind eye to psychotherapies that are devoid of scientific support.

Conclusions

Today, after 35 years of research into the model, NLP reminds one more of an unstable house built on sand rather than an edifice founded on a solid empirical foundation. In the title of his 1987 review of NLP, Sharpley posed a question: "nonsupportive data or untestable theory?" A year later Heap passed an "interim" verdict on NLP, as did Baddeley the following year. Given the amount of research that has been conducted on NLP in the subsequent decades, perhaps the time has come to render a more definitive conclusion.

A virtue of science is the ability to test all hypotheses, even the most implausible ones. If, however, scientists focused their interest *ad infinitum* on those hypotheses that continually failed to find support, the enterprise would soon lose its *raison d'être*. The present review suggests that enough evidence has been collected to announce a final verdict now: NLP is ineffective both as a model explaining human cognition and communication, and as a set of techniques of influence and persuasion.

Table 3

Comparison of 10 studies investigating the effectiveness of NLP techniques in communication, education, and a normal life

Study	Focus of study	Study population	Study design	Dependent variable	Outcome Supportive	Outcome Nonsupportive	Outcome Uncertain	Comments
Hale (1986)	The effects of NLP on public speaking anxiety	8 introductory psychology students	NRCT	public speaking anxiety		None of the results favored one treatment over the other		Rogerian oriented therapy as a placebo treatment in control group
Dixon et al. (1986)	NLP as a persuasive communication technique	98 undergraduates	RCT (placebo)	Behavioral and attitude measures		No differences neither in behavior nor in attitudes		The direct message treatment was more persuasive than the other treatments
Daupert (1986)	A covert imagery intervention into test anxiety based on a chained-anchor model	155 psychology students	RCT	Measures of worry/emotionality and reading performance		No overall treatment effect demonstrated, and no statistically significant differences in reading performance found		
Macy (1987)	NLP as a factor in skills acquisition	23 students	RCT (placebo)	Skills		The hypotheses were not accepted at the .05 level		
MacMorran (1987)	EMs as an submordality procedure on disturbing memory	16 male and 28 female adults	RCT	Clients subjective evaluation of therapy	Partial support—NLP Submodality participants did report that they experienced change and that they were more satisfied with their treatment significantly more than the control group	NLP claims for permanent cure were not supported		
Prezas (1991)	Effects of NLP on state-trait anxiety and academic performance using self-hypnosis	Senior level students	RCT	State-trait anxiety		The difference in the mean scores were not significant	Difference in long term (trait) and short term (state) anxiety between the pretest and post-test in the experimental group	
de Miranda et al. (1999)	The impact of application of NLP on child development, ment, home environment and maternal mental health	45 pairs mothers and children between 18 and 36 months of age	RCT	Child development, home environment variation maternal mental health		A trend was observed that indicated positive effects on the home environmental from the NLP intervention		At the end of the experiment 10 out of 23 children from experimental group remained
Fremder (1986)	Generalization of visual dot pattern strategies to number pattern stragies by learning disabled students	84 non- and learning disabled students between the ages of 12-0 and 15-11	RCT	Transfer to different visual pattern tasks, generalize to arithmetic sequencing		No difference between the treatment groups	Significant transfer effects for treatment groups when compared to the control group	
Lund (1995)	The effect of NLP on asthma symptoms	30 patients	RCT	Patients' lung capacity and their need for medication and hospitalization	Increase of lung capacity, reduction of: the rate of hospital admissions; The number of acute asthma episodes; The consumption of medication; Rate of sleep disorders, caused by asthmatic symptoms		Both the control group receiving only medical-treatment, as well as the group receiving the treatment combined with NLP showed improvement	
Stipancic et al. (2010)	Effects of NLPT on psychological difficulties and perceived quality of life	106 psychotherapy clients	RCT	Perceived psychological difficulties and perceived quality of life	In the therapy group, as compared to the control group there was a significant decrease of clinical symptoms and increase in the quality of life			Control group with no treatment

Note. EM = eye movement; RTC = randomized controlled study; NRTC = non randomized controlled study; PRS = primary representational system.

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